Inventory Web Service

User's Guide

USGS / EROS

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Revision Sheet

Release No.	Date	Revision Description
	07/29/2009	Original
Rev. 1	11/04/2009	Added JSON Interface information
Rev. 2	12/16/2009	1. New formatting for this document 2. Additional examples
Rev. 3	03/10/2010	1. Added new method information 2. Added JSON2 interface information
Rev. 4	03/25/2013	1. Added new methods 2. Updated all examples
Rev. 5	10/18/2013	Added "_Download_Only" versions for all "return_Attributes" methods

Inventory Web Service User's Guide

TABLE OF CONTENTS

1 GENERAL INFORMATION

1.1 Introduction

The USGS Seamless Data Warehouse (SDW) is comprised of two systems – a "Seamless" Data Server and a "Tiled" Data Server. "Seamless" datasets exist as large data mosaics from which a user can request to clip out any portion of the dataset using their own specific geographic limits. "Tiled" datasets are already clipped to a regular grid and exist as pre-packaged data bundles residing on either an on-line or a near-line storage system.

The USGS Seamless and Tiled Server functionality includes a set of web services for the developer that can be used to create custom data access applications. This document discusses how to use the Inventory web service to generate valid data requests. There are two additional web services that can be used with the Inventory web service to obtain the full resolution data.

Inventory Service. This is a data discovery service. This service will provide information about what data is available over a particular area of interest. The addition of new datasets and demotion of older datasets from on-line systems to near-line systems is an ongoing process. Updates to the Inventory Service occur on a monthly basis. Efforts are currently underway to include in the Inventory Service all of the datasets currently available through the USGS Seamless and Tiled servers. Use this service to determine product keys, output formats available, metadata options, and bundling options, and whether your desired data resides on the Seamless Data Server, the Tiled Data Server, or both.

Request Validation Service. Utilizing dataset information obtained from the previous call to the Inventory Service and a user-defined area of interest, this service verifies and validates the information, and then returns to the user either a fully parameterized URL(s) that can be used by the Download Service, or a direct URL to the data in the case of certain tiled datasets.

Download Service. This service initiates a request for data, queries the system to obtain a job status, and returns the requested data to the user.

Orthoimagery data that is no longer considered the "best available" is removed from on-line systems and map services on a periodic basis. When this occurs, the dataset is clipped into pre-packaged zip files and stored on near-line systems so that it can still be obtained by the public. These datasets currently show up in the Inventory Service with a STATUS = Tiled.

1.2 Organization of the Manual

Section 1 provides a general description of the system.

Section 2 provides a description of the SOAP interface to the Inventory Web Service.

- This interface expects a regular REST URL request and returns a SOAP response.

Section 3 provides a description of the JSON interface to the Inventory Web Service.

- This interface expects a JSON request and returns a JSON response.

Section 4 provides a description of the JSON2 interface to the Inventory Web Service.
This interface expects a regular REST URL request and returns a JSON response.

1.3 Acronyms and Abbreviations

Acronym	**Definition**
WMS	Web Map Service
SDDS	Seamless Data Distribution Server
TDDS	Tiled Data Distribution Server
WSDL	Web Service Description Language

2 SOAP INTERFACE

2.1 Overview

Use the following link to the web service description language (wsdl) page to examine the available methods and necessary data types.

http://stratus.cr.usgs.gov/index_service/Index_Service_SOAP.asmx?wsdl

Figure 2.1.1 shows a simple test page is also available for use in a web browser to see the methods that can be called in the Inventory Service:

http://stratus.cr.usgs.gov/index_service/Index_Service_SOAP.asmx

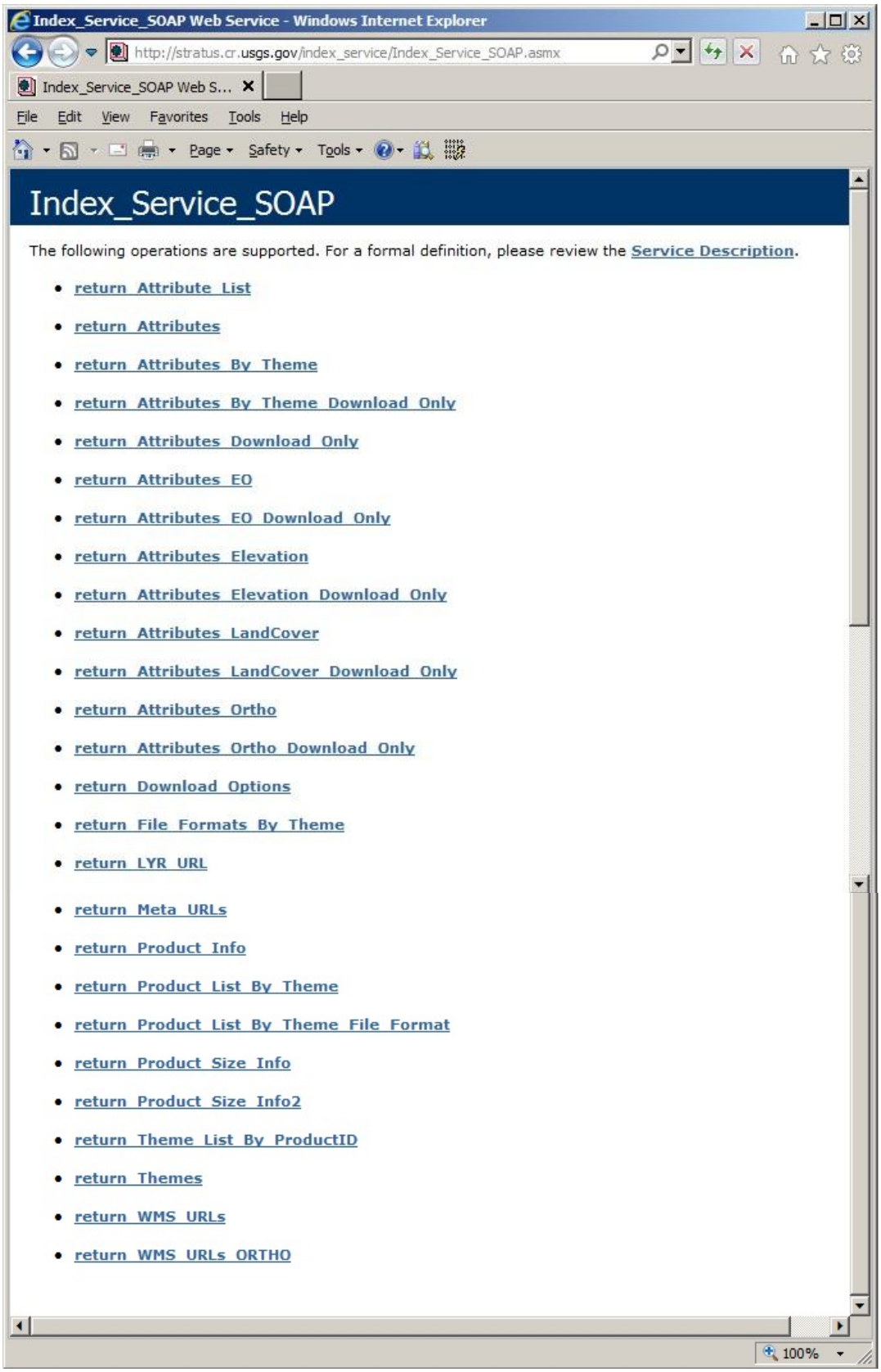

Index_Service_SOAP Web Service - Windows Internet Explorer
http://stratus.cr.usgs.gov/index_service/Index_Service_SOAP.asmx
Index_Service_SOAP Web S...
File Edit View Favorites Tools Help
Page Safety Tools
Index_Service_SOAP
The following operations are supported. For a formal definition, please review the Service Description.
return_Attribute_List
return_Attributes
return_Attributes_By_Theme
return_Attributes_By_Theme_Download_Only
return_Attributes_Download_Only
return_Attributes_EO
return_Attributes_EO_Download_Only
return_Attributes_Elevation
return_Attributes_Elevation_Download_Only
return_Attributes_LandCover
return_Attributes_LandCover_Download_Only
return_Attributes_Ortho
return_Attributes_Ortho_Download_Only
return_Download_Options
return_File_Formats_By_Theme
return_LYR_URL
return_Meta_URLs
return_Product_Info
return_Product_List_By_Theme
return_Product_List_By_Theme_File_Format
return_Product_Size_Info
return_Product_Size_Info2
return_Theme_List_By_ProductID
return_Themes
return_WMS_URLs
return_WMS_URLs_ORTHO
100%

Figure 2.1.1

2.2 return_Attribute_List

This method returns a list of ALL of the attributes that are available for querying per dataset. Note that each of these attributes is not guaranteed to be populated for every dataset, although most are. For example, a "view-only" dataset will have a blank value for the PRODUCTKEY attribute which designates the USGS internal download code for that dataset. Please refer to the document "Inventory Web Service Attribute Descriptions" for a text description of the meaning of each attribute and possible values for each attribute. See Figure 2.2.1 for a listing of available dataset attributes.

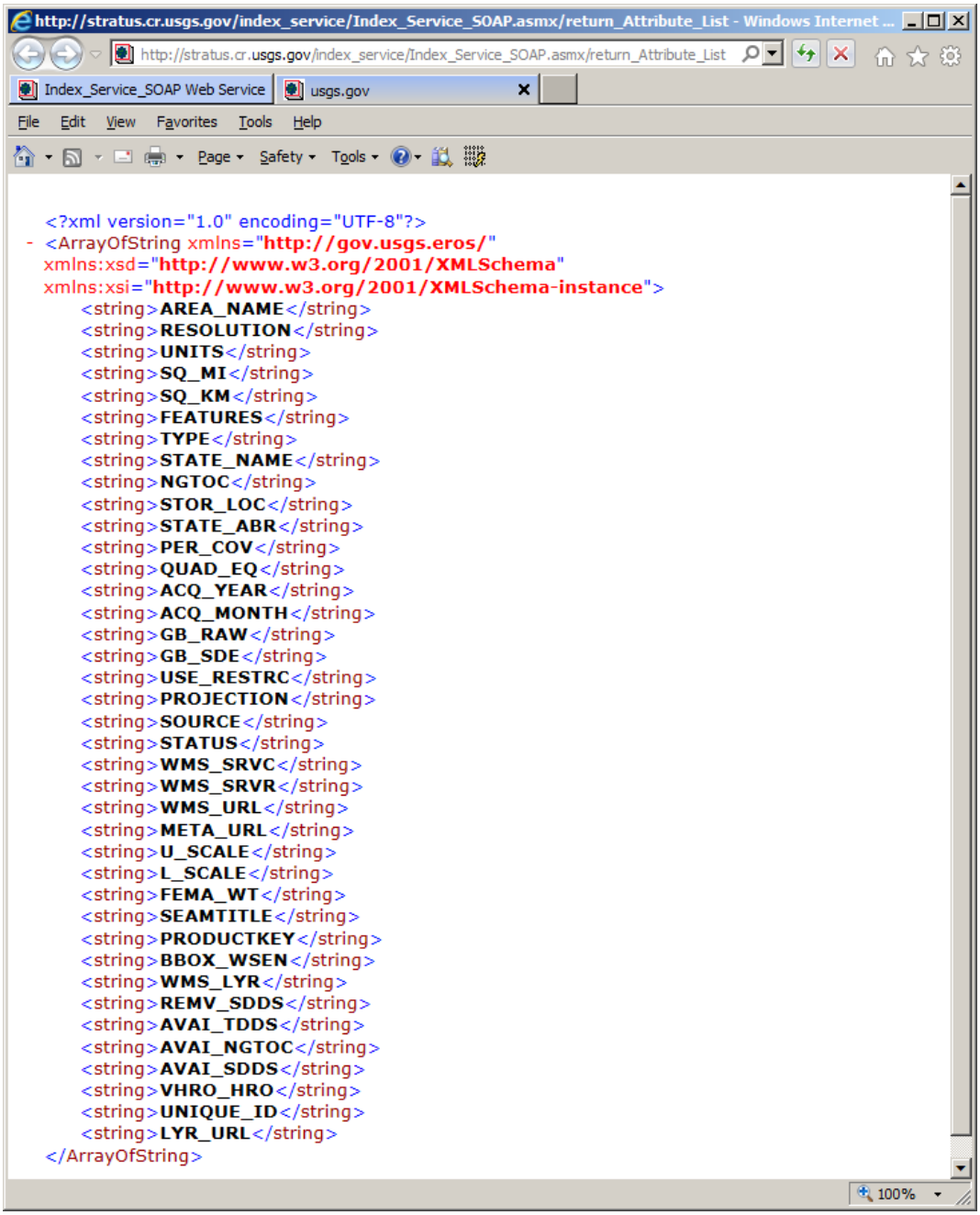


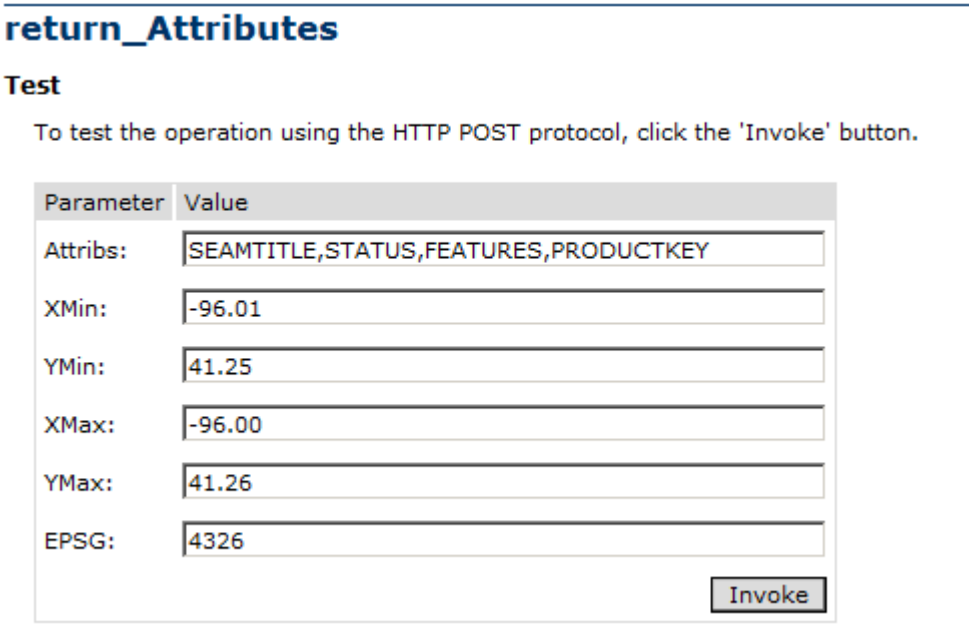
Figure 2.2.1

2.3 return_Attributes

This is the method that is used to return information for a specific geographic area for all available data themes. As its input it requires a comma separated list of desired attributes (obtained from **return_Attribute_List** method described above), a geographic area of interest, and a projection code. Currently, the only projection code that can be used is:

4326: Geographic WGS-84

Using the test page, here is an example for the Omaha, Nebraska area. Our query will look like this:



This query is asking for four attributes to be returned for each product that intersects the area of interest. When we invoke this method we see quite a bit of information returned – the four attributes we requested for each product from the USGS EROS Seamless and Tiled inventories that has been intersected.

A partial listing of the results is as follows- this section showing a tiled dataset from the Orthoimagery theme:


```
<ArrayOfCustomAttributes>
    <CustomAttributes>
        <AttribName>SEAMTITLE</AttribName>
        <AttribValue>Apr 2004 0.25m Color Orthoimagery - Omaha,
    NE</AttribValue>
    </CustomAttributes>
    <CustomAttributes>
        <AttribName>STATUS</AttribName>
```

```
            <AttribValue>Tiled</AttribValue>
        </CustomAttributes>
        <CustomAttributes>
            <AttribName>FEATURES</AttribName>
            <AttribValue>No_WMS</AttribValue>
        </CustomAttributes>
        <CustomAttributes>
            <AttribName>PRODUCTKEY</AttribName>
            <AttribValue>OFO</AttribValue>
        </CustomAttributes>
</ArrayOfCustomAttributes>
```

Further down in the results is another product, this one from the Land Cover theme…

```
<ArrayOfCustomAttributes>
    <CustomAttributes>
        <AttribName>SEAMTITLE</AttribName>
        <AttribValue>National Land Cover Database 2001 - Land
        Cover</AttribValue>
    </CustomAttributes>
    <CustomAttributes>
        <AttribName>STATUS</AttribName>
        <AttribValue>Tiled</AttribValue>
    </CustomAttributes>
    <CustomAttributes>
        <AttribName>FEATURES</AttribName>
        <AttribValue>No_WMS</AttribValue>
    </CustomAttributes>
    <CustomAttributes>
        <AttribName>PRODUCTKEY</AttribName>
        <AttribValue>L1L</AttribValue>
    </CustomAttributes>
</ArrayOfCustomAttributes>
```

And later we see a 'View-Only" dataset. Since this dataset is View-Only, there is no product key associated with this dataset.

```
<ArrayOfCustomAttributes>
    <CustomAttributes>
        <AttribName>SEAMTITLE</AttribName>
        <AttribValue>Viewable Combined High Resolution
    Orthoimagery</AttribValue>
    </CustomAttributes>
    <CustomAttributes>
        <AttribName>STATUS</AttribName>
        <AttribValue>Seamless_VO</AttribValue>
    </CustomAttributes>
    <CustomAttributes>
        <AttribName>FEATURES</AttribName>
        <AttribValue>View_Only</AttribValue>
    </CustomAttributes>
    <CustomAttributes>
        <AttribName>PRODUCTKEY</AttribName>
```

```
            <AttribValue />
        </CustomAttributes>
    </ArrayOfCustomAttributes>
```

Therefore, this method can be used to retrieve whatever information you desire regarding datasets in your particular area or interest. This information can then be presented to the user in your particular application depending on your needs.

2.4 return_Attributes_Download_Only

This method will return all of the same results as the "return_Attributes" method described in Section 2.3 except for the View-Only datasets. Using this method will cut down on the number of results returned if you are only interested in obtaining information about datasets that can be downloaded.

2.5 return_Attributes_By_Theme

This method returns requested attributes by querying the datasets you include in a comma-delimited list of THEMES, or leave the ThemeList blank to return all.

2.6 return_Attributes_By_Theme_Download_Only

This method returns requested attributes by querying the datasets you include in a comma-delimited list of THEMES, or leave the ThemeList blank to return all. Only records for datasets that can be downloaded will be returned.

2.7 return_Attributes_EO

This method returns requested attributes by querying only those datasets in the Emergency Operations theme.

2.8 return_Attributes_EO_Download_Only

This method returns requested attributes by querying only those datasets in the Emergency Operations theme. Only records for datasets that can be downloaded will be returned.

2.9 return_Attributes_Elevation

This method returns requested attributes by querying only those datasets in the Elevation theme.

2.10 return_Attributes_Elevation_Download_Only

This method returns requested attributes by querying only those datasets in the Elevation theme. Only records for datasets that can be downloaded will be returned.

2.11 return_Attributes_LandCover

This method returns requested attributes by querying only those datasets in the Land Cover theme.

2.12 return_Attributes_LandCover_Download_Only

This method returns requested attributes by querying only those datasets in the Land Cover theme. Only records for datasets that can be downloaded will be returned.

2.13 return_Attributes_Ortho

This method returns requested attributes by querying only those datasets in the Orthoimagery theme.

2.14 return_Attributes_Ortho_Download_Only

This method returns requested attributes by querying only those datasets in the Orthoimagery theme. Only records for datasets that can be downloaded will be returned.

2.15 return_Download_Options

Downloadable datasets are available to the public by including some user-defined options when submitting a download request. Depending on whether you desire a Seamless or a Tiled dataset, current options may be 1) the output format, 2) the type of metadata included in the download bundle, and 3) the type of file compression for the download bundle. Use this method to find out which of these options are available for a specific product. This method takes a PRODUCTKEY as input and returns the valid output formats, compression formats and metadata formats for this product.

If we use the PRODUCTKEY of "N1F" as our input, we get back this response showing the available download options for a Tiled (TDDS) product:

```
<DownloadOptions>
    <productid>N1F</productid>
    <type>TDDS</type>
    <outputformat> 05-GridFloat,01-ArcGRID,12-IMG</outputformat>
    <compressionformat>Z-ZIP</compressionformat>
    <metadataformat>A-ALL</metadataformat>
</DownloadOptions>
```

The "outputformat" tag tells us that this Tiled product is available in three formats: GridFloat, ArcGrid, and IMG.

The "compressionformat" tag describes the possible bundling options – in this case, the bundle is available only as a zip file.

The “metadataformat” tag states that all possible formats of the metadata are included in the zip bundle.

Some of this information is required if you are going to request the data for downloading. When you request a Seamless product for download, you must also specify the desired output format, metadata format and bundling method. For Tiled products, you must only specify the productid and the desired output format.

2.16 return_File_Formats_By_Theme

This method can be used for obtaining a list of all possible output formats for layers in a data theme. Note that every dataset in this theme may not be available in all of the output formats listed in the response.


```
<FileFormats>
    <formatid>02</formatid>
    <formatname>GeoTIFF</formatname>
</FileFormats>
<FileFormats>
    <formatid>12</formatid>
    <formatname>IMG</formatname>
</FileFormats>
<FileFormats>
    <formatid>13</formatid>
    <formatname>JPG</formatname>
</FileFormats>
<FileFormats>
    <formatid>14</formatid>
    <formatname>JPG2000</formatname>
</FileFormats>
```

2.17 return_LYR_URL

This method can be used for obtaining a URL to the LYR (layer) file corresponding to the Service Name you input.

2.18 return_Meta_URLs

This method returns a list of URLs that can be used to obtain metadata URLs so that you can view the html metadata without downloading the data first.

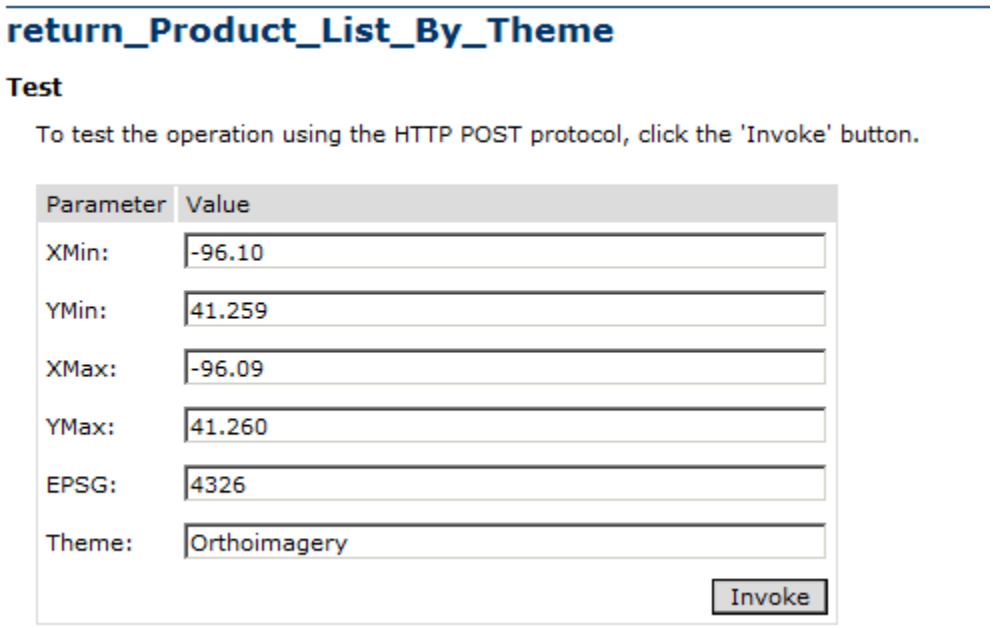
2.19 return_Product_Info

This method can be used for obtaining a few pre-defined attributes describing a particular dataset. For example, if we submit a productID of "P13" to obtain product information about NAIP data in UTM Zone 13, the data that was returned includes a metadata URL, and information that can be used to make a WMS image request.


```
<ProductInfo>
    <productid>P13</productid>
    <type>SDDS</type>
    <productname>NAIP (4 Band) UTM Zone 13N</productname>
    <metadataurl>http://extract.cr.usgs.gov/distmeta/servlet/gov.usgs.edc.MetaBuilder?TYPE=HTML&DATASET=NAIP_Z13_G4</metadataurl>
    <wmsdisplaymapservicelayer>http://isse.cr.usgs.gov/ArcGIS/services/Orthoimagery/USGS_EDC_Ortho_NAIP/MapServer/WMSServer/?LAYERS=0</wmsdisplaymapservicelayer>
    <wmsoutlinemapservicelayer>http://imsortho.cr.usgs.gov/servlet/com.esri.esrimap.Esrimap/USGS_EDC_Ortho_NAIP_Footprints?LAYERS=NAIP_UTM13_4BAND_FOOTPRINT</wmsoutlinemapservicelayer>
</ProductInfo>
```

2.20 return_Product_List_By_Theme

This method can be used for obtaining a pre-defined list of attributes for all of the products of a particular theme that intersect with a particular geographic area.



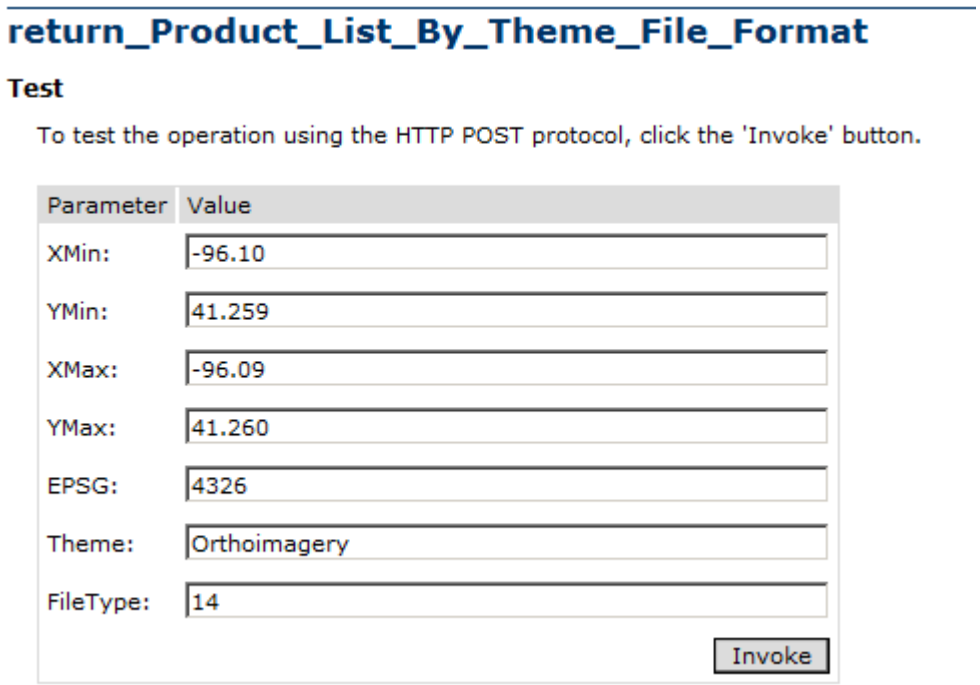
A partial listing of the response provides a product name, whether this is a Tiled (TDDS) or a Seamless (SDDS) dataset, metadata, and WMS information about each orthoimagery layer intersecting this area of interest.

```
<ThemeLayerInfo>
    <productid>OFO</productid>
    <type>TDDS</type>
    <productname>Apr 2004 0.25m Color Orthoimagery - Omaha,
    NE</productname>
    <metadataurl>http://extract.cr.usgs.gov/distmeta/servlet/gov.usgs.edc.Me
    taBuilder?TYPE=HTML&DATASET=NE_00001</metadataurl>
    <wmsdisplaymapservicelayer />
    <wmsoutlinemapservicelayer>http://tddsinfo.cr.usgs.gov/ArcGIS/rest/servic
    es/?LAYERS=200404_Omaha_0x2500m_CL_OFO_TileIndex</wmsoutlinemap
    servicelayer>
</ThemeLayerInfo>
...
<ThemeLayerInfo>
    <productid>OJT</productid>
    <type>TDDS</type>
    <productname>Apr 2010 0.15m Color Orthoimagery - Douglas County,
    NE</productname>
    <metadataurl>http://extract.cr.usgs.gov/distmeta/servlet/gov.usgs.edc.Me
    taBuilder?TYPE=HTML&DATASET=NE_00005</metadataurl>
```

<wmsdisplaymapservicelayer />
<wmsoutlinemapservicelayer>**http://tddsinfo.cr.usgs.gov/ArcGIS/rest/services/201004_DouglasCounty_0x1500m_CL_OJT_Footprint?LAYERS=201004_DouglasCounty_0x1500m_CL_OJT_TileIndex**</wmsoutlinemapservicelayer>
</ThemeLayerInfo>
…
<ThemeLayerInfo>
<productid>**P14**</productid>
<type>**SDDS**</type>
<productname>**NAIP (4 Band) UTM Zone 14N**</productname>
<metadataurl>**http://extract.cr.usgs.gov/distmeta/servlet/gov.usgs.edc.MetaBuilder?TYPE=HTML&DATASET=NAIP_Z14_G4**</metadataurl>
<wmsdisplaymapservicelayer>**http://isse.cr.usgs.gov/ArcGIS/services/Orthoimagery/USGS_EDC_Ortho_NAIP/MapServer/WMSServer/?LAYERS=0**</wmsdisplaymapservicelayer>
<wmsoutlinemapservicelayer>**http://imsortho.cr.usgs.gov/servlet/com.esri.esrimap.Esrimap/USGS_EDC_Ortho_NAIP_Footprints?LAYERS=NAIP_UTM14_4BAND_FOOTPRINT**</wmsoutlinemapservicelayer>
</ThemeLayerInfo>

2.21 return_Product_List_By_Theme_File_Format

Using the same input as shown in Section 2.14, but this time also restricting the output by a selected output file format, we return only a subset (only those datasets with a possible output format of 14 (JPG2000).



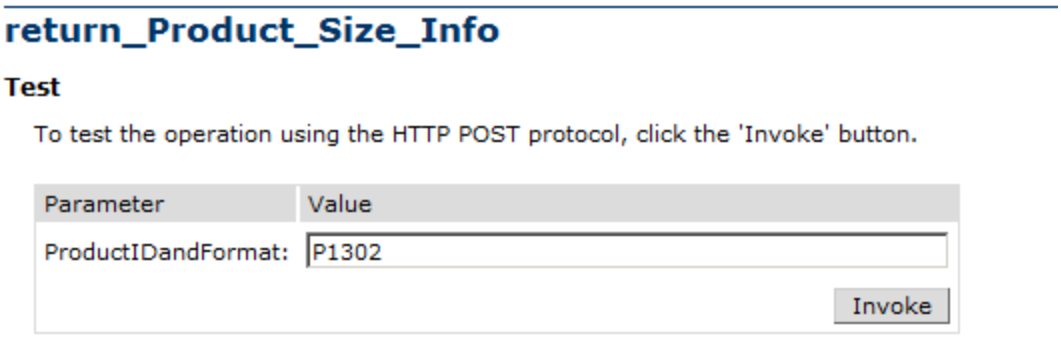
In order to save disk storage space, most Orthoimagery datasets are being converted from GeoTiff to JPG2000 format. This will allow USGS to provide more orthoimagery to the public.

<ThemeLayerInfo>
<productid>**P14**</productid>
<type>**SDDS**</type>
<productname>**NAIP (4 Band) UTM Zone 14N**</productname>
<metadataurl>**http://extract.cr.usgs.gov/distmeta/servlet/gov.usgs.edc.MetaBuilder?TYPE=HTML&DATASET=NAIP_Z14_G4**</metadataurl>
<wmsdisplaymapservicelayer>**http://isse.cr.usgs.gov/ArcGIS/services/Orthoimagery/USGS_EDC_Ortho_NAIP/MapServer/WMSServer/?LAYERS=0**</wmsdisplaymapservicelayer>
<wmsoutlinemapservicelayer>**http://imsortho.cr.usgs.gov/servlet/com.esri.esrimap.Esrimap/USGS_EDC_Ortho_NAIP_Footprints?LAYERS=NAIP_UTM14_4BAND_FOOTPRINT**</wmsoutlinemapservicelayer>
</ThemeLayerInfo>
<ThemeLayerInfo>
<productid>**v8i**</productid>
<type>**SDDS**</type>
<productname>**Mar 2007 Color Orthoimagery - Douglas County, NE**</productname>
<metadataurl>**http://extract.cr.usgs.gov/distmeta/servlet/gov.usgs.edc.MetaBuilder?TYPE=HTML&DATASET=ST_126_001&**</metadataurl>
<wmsdisplaymapservicelayer>**http://imsortho.cr.usgs.gov/wmsconnector/com.esri.wms.Esrimap/USGS_EDC_Ortho_Nebraska?LAYERS=NE_DouglasCounty_0.5ft_Color_Mar_2007_01,NE_DouglasCounty_0.5ft_Color_Mar_2007_02**</wmsdisplaymapservicelayer>
<wmsoutlinemapservicelayer>**http://imsortho.cr.usgs.gov/servlet/com.esri.esrimap.Esrimap/USGS_EDC_Ortho_Nebraska?LAYERS=NE_DouglasCounty_0.5ft_Color_Mar_2007_Footprint**</wmsoutlinemapservicelayer>
</ThemeLayerInfo>

2.22 return_Product_Size_Info

Earlier versions of the Inventory Service did not have the capability to provide output format information about Tiled datasets. Therefore, this method provided valid information and xml tags appropriate for Seamless datasets only. Use the newer "return_Product_Size_Info2" method which will provide more correct xml tags for Tiled datasets.

Given a product key and desired output format, this method returns the estimated file size in MB per square degree for Seamless datasets. Using this value and your area of interest, you can then estimate the total size in MB of your requested area. Since the response xml tag is <mbsqdeg>, it is appropriate for Seamless datasets, but not Tiled datasets.




```
<ProductSizeInfo>
    <productidformat>p1302</productidformat>
    <mbsqdeg>30000</mbsqdeg>
</ProductSizeInfo>
```

2.23 return_Product_Size_Info2

This method provides size information for both Tiled and Seamless datasets. The xml response tags are different depending on whether the product is Tiled or Seamless. "P1302" is a designator for a Seamless dataset (P13) in GeoTiff format (02). Notice the <mbsqdeg> tag in the response:

```
<productidformat>p1302</productidformat>
<mbsqdeg>30000</mbsqdeg>
```

Since Tiled datasets are pre-packaged and of a consistent geographic area per tile, this method provides a different tag for Tiled datasets. "OPX02" is a designator for a Tiled dataset (OPX) in GeoTiff format (02). Notice the <mbtile> tags in the response:

```
<productidformat>OPX02</productidformat>
<mbtile>75</mbtile>
```

Therefore, you can use this method to provide approximate tile sizes or area of interest size estimates per available product/format combination.

2.24 return_Theme_List_By_ProductID

This method returns a list of those themes which contain the specific product.

2.25 return_Themes

Various datasets have been assigned to one or more data themes. Use this method to obtain the current list of themes and their corresponding theme IDs.

2.26 return_WMS_URLs

Use this method to obtain pre-made example URLs for WMS requests for a specific geographic area. Three data themes are currently queried – Elevation, Land Cover, and Orthoimagery. Note that the particular map service may not honor the requests with a valid image if the map service has pre-defined limits based on scale or other factors. These URLs serve only as examples that can be modified as needed. Datasets that reside on USGS EROS on-line systems will have valid WMS URLs. "Historical" datasets that have been demoted to near-line systems have been removed from the map services and therefore will no longer have WMS information contained in their records.

2.27 return_WMS_URLs_ORTHO

Use this method to obtain pre-made example URLs for WMS requests for a specific geographic area. Only Orthoimagery datasets are queried. Note that the particular map service may not honor the requests with a valid image if the map service has pre-defined limits based on scale or other factors. These URLs serve only as examples that can be modified as needed. Datasets that reside on USGS EROS on-line systems will have valid WMS URLs. "Historical" datasets that have been demoted to near-line systems have been removed from the map services and therefore will no longer have WMS information contained in their records.

3 JSON INTERFACE

3.1 Overview

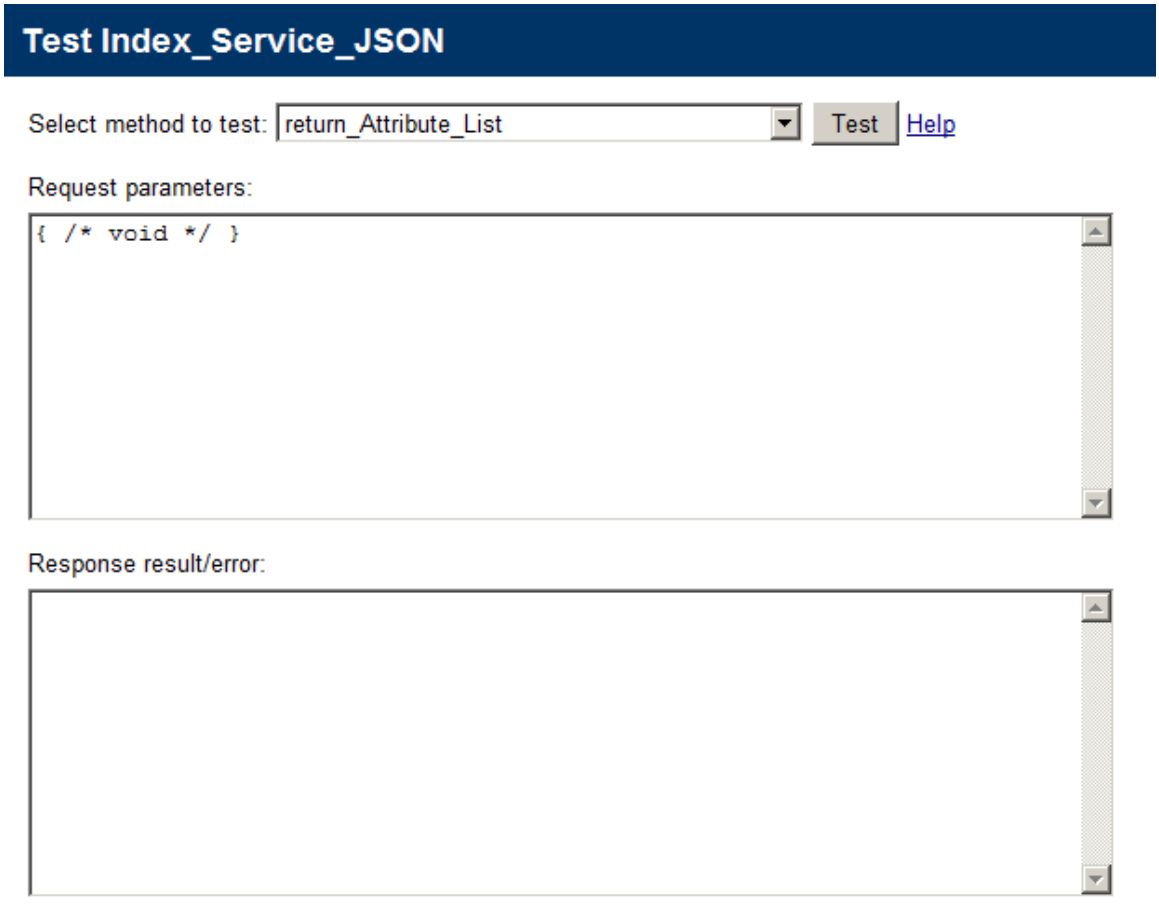
This interface shows a JSON request and the expected JSON response.

Use the following link to view the available methods.

http://stratus.cr.usgs.gov/index_service/Index_Service_JSON.ashx

A simple test page is also available for use in a browser to see the methods that can be called in the Inventory Service:

http://stratus.cr.usgs.gov/index_service/Index_Service_JSON.ashx?test



3.2 return_Attribute_List

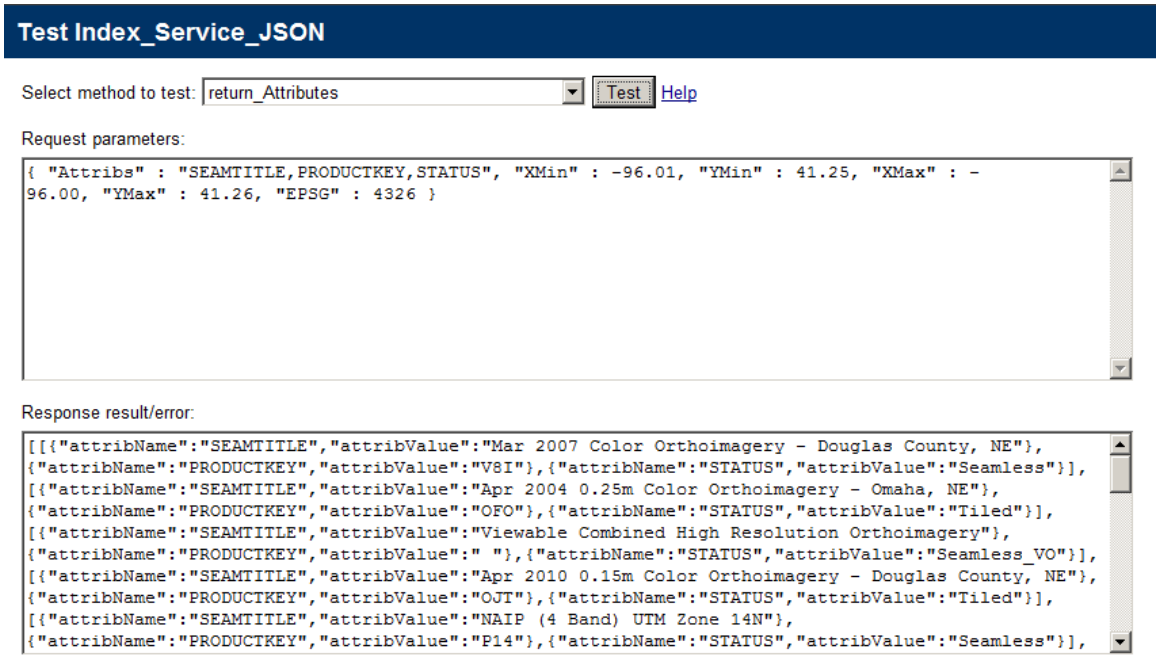
This method returns a list of ALL of the attributes that are available for querying per dataset. Note that each of these attributes is not guaranteed to be populated for every dataset, although most are. For example, a "view-only" dataset will have a blank entry for the PRODUCTKEY attribute which designates the USGS internal download code for that dataset. Please refer to the document "Inventory Web Service Attribute Descriptions" for a text description of the meaning of each attribute and possible values for each attribute.

3.3 return_Attributes

This is the method that is used to return information for a specific geographic area for all available data themes. As its input it requires a comma separated list of desired attributes (obtained from **return_Attribute_List** method described above), a geographic area of interest, and a projection code. Currently, the only projection code that can be used is:

4326: Geographic WGS-84

Using the test page, here is an example for the Omaha, Nebraska area. Our query will look like this:



When we invoke this method we get quite a few records returned – each record is a product from the USGS EROS Seamless or Tiled inventories.

Therefore, this method can be used to retrieve whatever information you desire regarding datasets in your particular area or interest. This information can then be presented to the user in your particular application depending on your needs.

3.4 return_Attributes_Download_Only

This method will return all of the same results as the "return_Attributes" method described in Section 3.3 except for the View-Only datasets. Using this method will cut down on the number of results returned if you are only interested in obtaining information about datasets that can be downloaded.

3.5 return_Attributes_By_Theme

This method returns requested attributes by querying the datasets you include in a comma-delimited list of THEMES, or leave the ThemeList blank to return all.

3.6 return_Attributes_By_Theme_Download_Only

This method returns requested attributes by querying the datasets you include in a comma-delimited list of THEMES, or leave the ThemeList blank to return all. Only records for datasets that can be downloaded will be returned.

3.7 return_Attributes_EO

This method returns requested attributes by querying only those datasets in the Emergency Operations theme.

3.8 return_Attributes_EO_Download_Only

This method returns requested attributes by querying only those datasets in the Emergency Operations theme. Only records for datasets that can be downloaded will be returned.

3.9 return_Attributes_Elevation

This method returns requested attributes by querying only those datasets in the Elevation theme.

3.10 return_Attributes_Elevation_Download_Only

This method returns requested attributes by querying only those datasets in the Elevation theme. Only records for datasets that can be downloaded will be returned.

3.11 return_Attributes_LandCover

This method returns requested attributes by querying only those datasets in the Land Cover theme.

3.12 return_Attributes_LandCover_Download_Only

This method returns requested attributes by querying only those datasets in the Land Cover theme. Only records for datasets that can be downloaded will be returned.

3.13 return_Attributes_Ortho

This method returns requested attributes by querying only those datasets in the Orthoimagery theme.

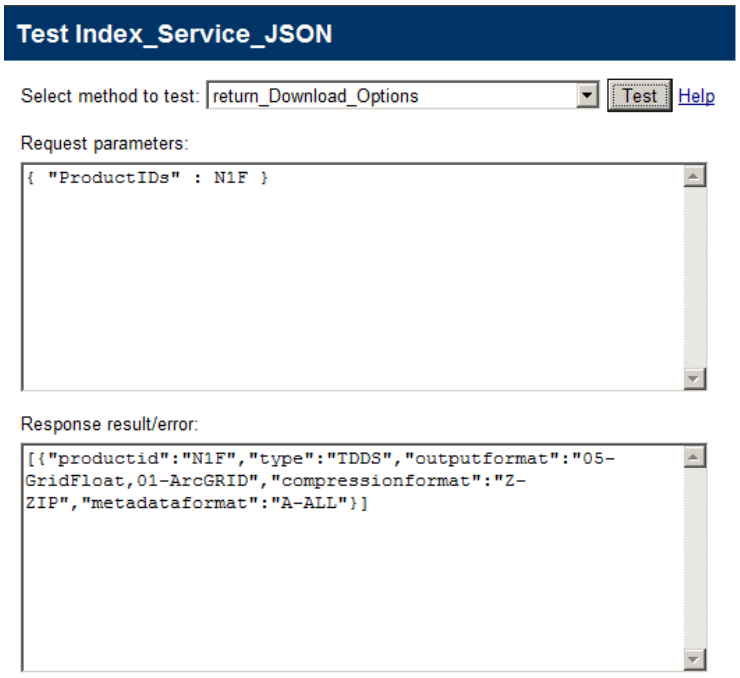
3.14 return_Attributes_Ortho_Download_Only

This method returns requested attributes by querying only those datasets in the Orthoimagery theme. Only records for datasets that can be downloaded will be returned.

3.15 return_Download_Options

Downloadable datasets are available to the public by including some user-defined options when submitting a download request. Depending on whether you desire a Seamless or a Tiled dataset, current options may be 1) the output format, 2) the type of metadata included in the download bundle, and 3) the type of file compression for the download bundle. Use this method to find out which of these options are available for a specific product. This method takes a PRODUCTKEY as input and returns the valid output formats, compression formats and metadata formats for this product.

If we use the PRODUCTKEY of "N1F" as our input, we get back this response showing the available download options for a Tiled (TDDS) product:



The “outputformat” tag tells us that this Tiled product is available in two formats: GridFloat and ArcGrid.

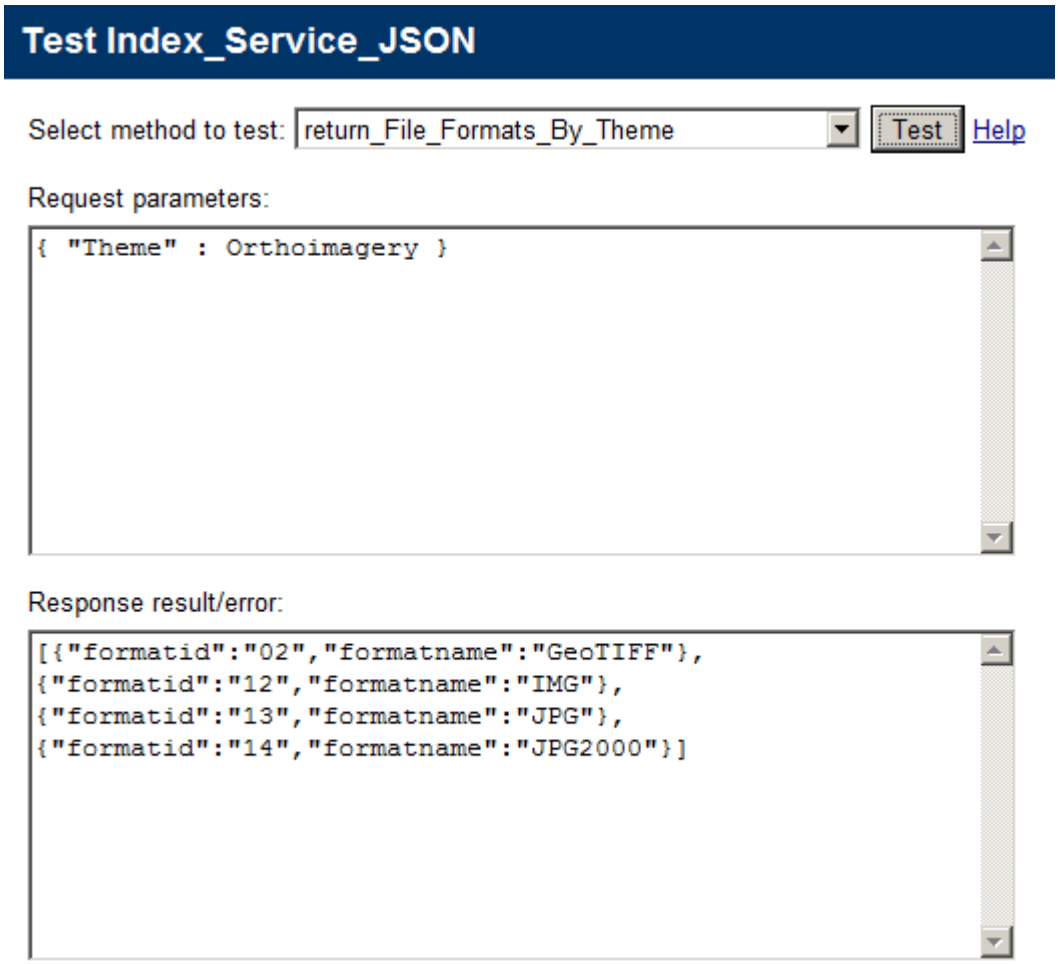
The “compressionformat” tag describes the possible bundling options – in this case, the bundle is available only as a zip file.

The “metadataformat” tag states that all possible formats of the metadata are included in the zip bundle.

Some of this information is required if you are going to request the data for downloading. When you request a Seamless product for download, you must also specify the desired output format, metadata format and bundling method. For Tiled products, you must only specify the productid and the desired output format.

3.16 return_File_Formats_By_Theme

This method can be used for obtaining a list of all possible output formats for layers in a data theme. Note that every dataset in this theme may not be available in all of the output formats listed in the response.



3.17 return_LYR_URL

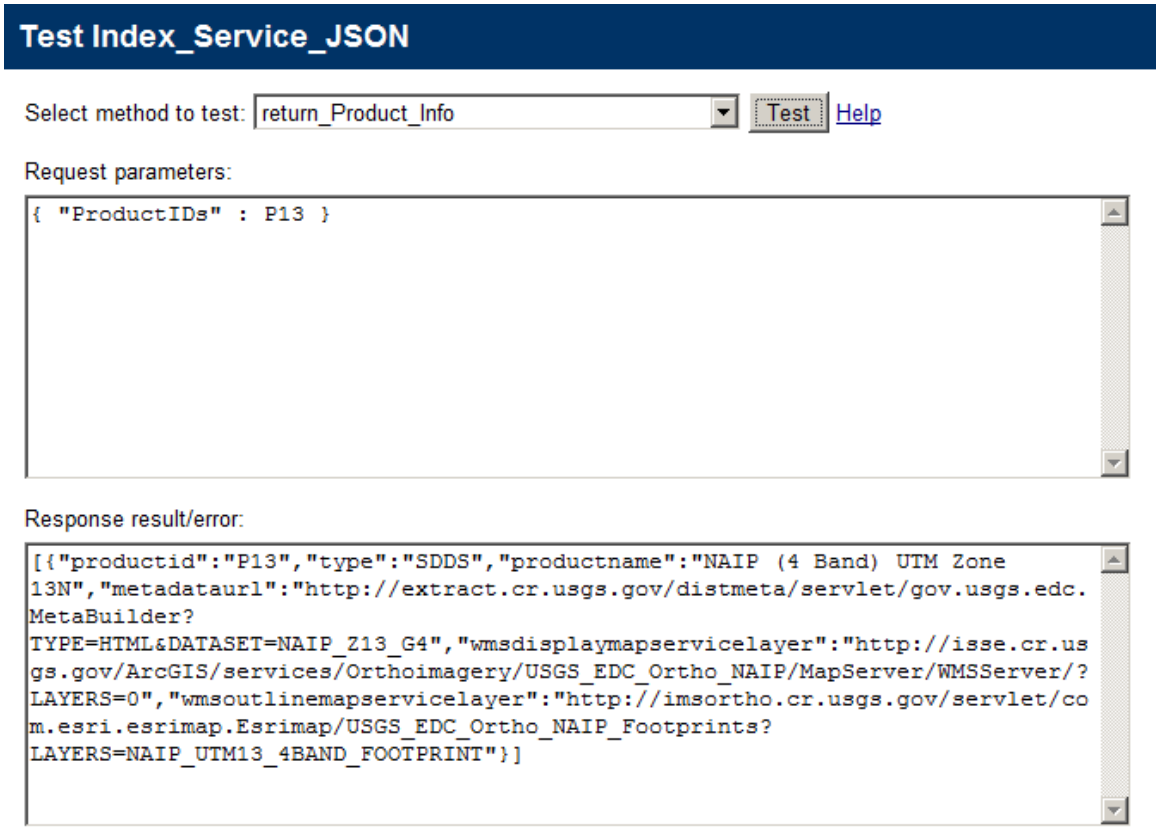
This method can be used for obtaining a URL to the LYR file corresponding to the ServiceName you input.

3.18 return_Meta_URLs

This method returns a list of URLs that can be used to look at the html metadata without downloading the data first.

3.19 return_Product_Info

This method can be used for obtaining a few pre-defined attributes describing a particular dataset. For example, if we submit a productID of "P13" to obtain product information about NAIP data in UTM Zone 13, the data that was returned includes a metadata URL, and information that can be used to make a WMS image request.



3.20 return_Product_List_By_Theme

This method can be used for obtaining a pre-defined list of attributes for all of the products of a particular theme that intersect with a particular geographic area.

3.21 return_Product_List_By_Theme_File_Format

Using the same input as shown in Section 3.14, but this time also restricting the output by a selected output file format, we return only a subset (only those datasets with a possible output format of 14 (JPG2000).

As of March 2013, there are only two orthoimagery datasets available in JPG2000 format in this area of interest.

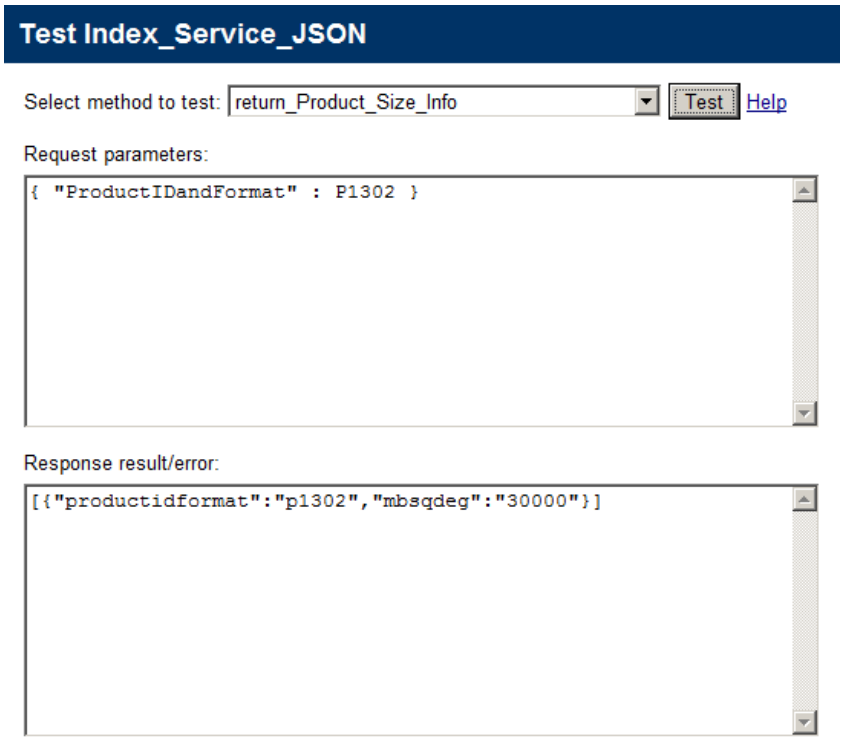

```
[
        {       "productid":"p14",
                "type":"SDDS",
                "productname":"NAIP (4 Band) UTM Zone 14N",
                "metadataurl":"http://extract.cr.usgs.gov/distmeta/servlet/
                gov.usgs.edc.MetaBuilder?TYPE=HTML&DATASET=NAIP_Z14_G4",
                "wmsdisplaymapservicelayer":"http://isse.cr.usgs.gov/ArcGIS/services/
                Orthoimagery/USGS_EDC_Ortho_NAIP/MapServer/WMSServer/?LAYERS=0",
                "wmsoutlinemapservicelayer":"http://imsortho.cr.usgs.gov/servlet/
```

```
            com.es ri.esrimap.Esrimap/USGS_EDC_Ortho_NAIP_Footprints?
            LAYERS=NAIP_UTM14_4BAND_FOOTPRINT"
        },
        {       "productid":"v8i",
            "type":"SDDS",
            "productname":"Mar 2007 Color Orthoimagery - Douglas County, NE",
            "metadataurl":"http://extract.cr.usgs.gov/distmeta/servlet/
            gov.usgs.edc.MetaBuilder?TYPE=HTML&DATASET=ST_126_001&",
            "wmsdisplaymapservicelayer":"http://imsortho.cr.usgs.gov/wmsconnector/
            com.esri.wms.Esrimap/USGS_EDC_Ortho_Nebraska?LAYERS=
            NE_DouglasCounty_0.5ft_Color_Mar_2007_01,NE_DouglasCounty_0.5ft_
            Color_Mar_2007_02",
            "wmsoutlinemapservicelayer":"http://imsortho.cr.usgs.gov/servlet/
            com.esri.esrimap.Esrimap/USGS_EDC_Ortho_Nebraska?LAYERS=
            NE_DouglasCounty_0.5ft_Color_Mar_2007_Footprint"
        }
]
```


3.22 return_Product_Size_Info

Earlier versions of the Inventory Service did not have the capability to provide output format information about Tiled datasets. Therefore, this method provided valid information and xml tags appropriate for Seamless datasets only. Use the newer "return_Product_Size_Info2" method which will provide more correct xml tags for Tiled datasets.

Given a product key and desired output format, this method returns the estimated file size in MB per square degree for Seamless datasets. Using this value and your area of interest, you can then estimate the total size in MB of your requested area. Since the response xml tag is <mbsqdeg>, it is appropriate for Seamless datasets, but not Tiled datasets.



3.23 return_Product_Size_Info2

This method provides size information for both Tiled and Seamless datasets. The xml response tags are different depending on whether the product is Tiled or Seamless. "P1302" is a designator for a Seamless dataset (P13) in GeoTiff format (02). Notice the <mbsqdeg> tag in the response:


```
[
	{	"productidformat":"p1302",
		"mbsqdeg":"30000"
	}
]
```


Since Tiled datasets are pre-packaged and of a consistent geographic area per tile, this method provides a different tag for Tiled datasets. "OPX02" is a designator for a Tiled dataset (OPX) in GeoTiff format (02). Notice the <mbtile> tags in the response:


```
[
	{	"productidformat":"OPX02",
		"mbtile":"75"
	}
]
```


Therefore, you can use this method to provide approximate tile sizes or area of interest size estimates per available product/format combination.

3.24 return_Theme_List_By_ProductID

This method returns a list of those themes which contain the specific product.

3.25 return_Themes

Various datasets have been assigned to one or more data "themes". Use this method to obtain the current list of themes and their corresponding theme IDs.

3.26 return_WMS_URLs

Use this method to obtain pre-made example URLs for WMS requests for a specific geographic area. Three data themes are currently queried – Elevation, Land Cover, and Orthoimagery. Note that the particular mapservice may not honor the requests with a valid image if the mapservice has pre-defined limits based on scale or other factors. These URLs serve only as examples that can be modified as needed. Datasets that reside on USGS EROS on-line systems will have valid WMS URLs. "Historical" datasets that have been demoted to near-line systems have been removed from the map services and therefore will no longer have WMS information contained in their records.

3.27 return_WMS_URLs_ORTHO

Use this method to obtain pre-made example URLs for WMS requests for a specific geographic area. Only Orthoimagery datasets are queried. Note that the particular mapservice may not honor the requests with a valid image if the mapservice has pre-defined limits based on scale or other factors. These URLs serve only as examples that can be modified as needed. Datasets that reside on USGS EROS on-line systems will have valid WMS URLs. "Historical" datasets that have been demoted to near-line systems have been removed from the map services and therefore will no longer have WMS information contained in their records.

4 JSON2 INTERFACE

4.1 Overview

Use this interface when you want to make a REST request and receive a JSON response.

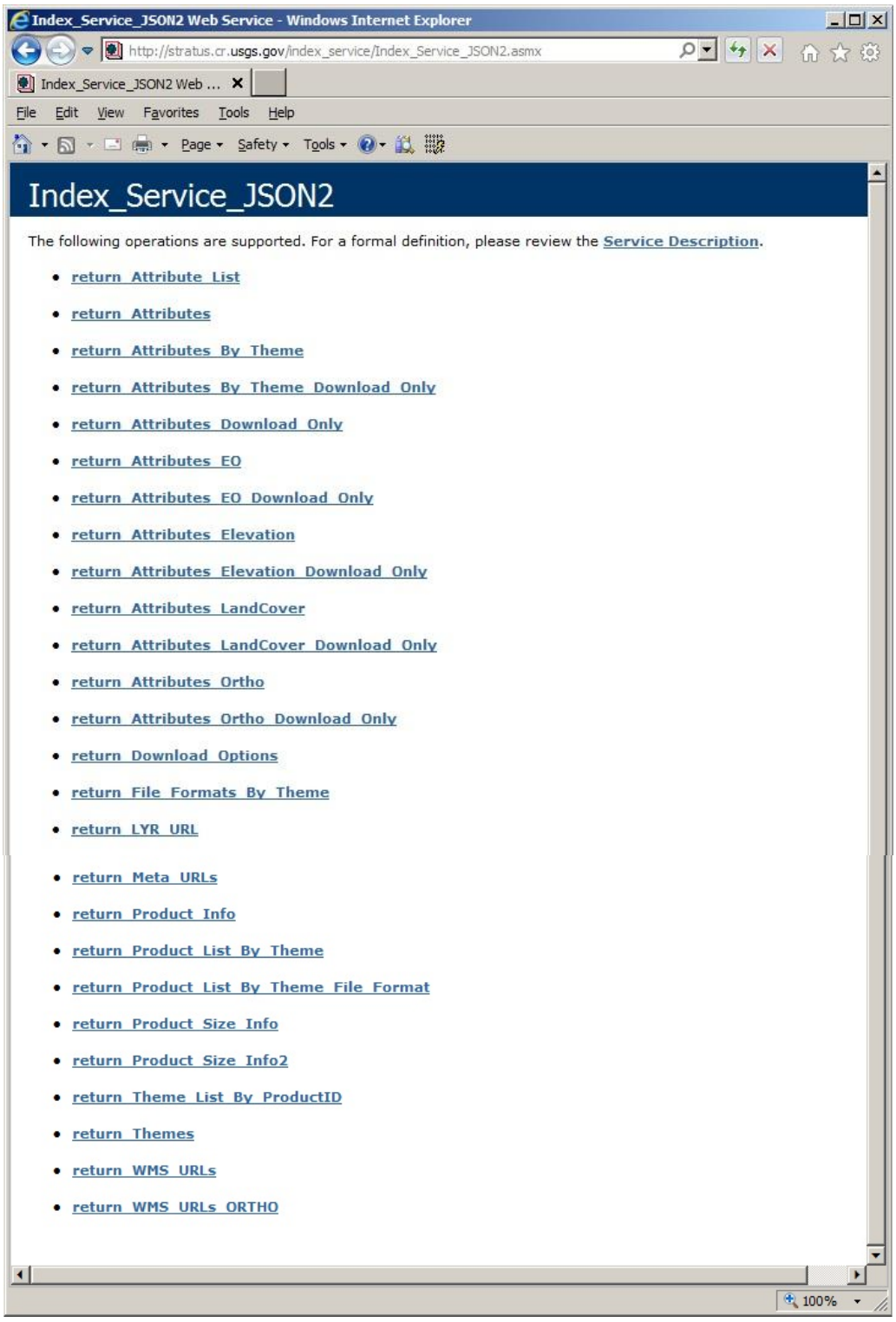
Use the following link to the web service description language (wsdl) page to examine the available methods and necessary data types.

http://stratus.cr.usgs.gov/index_service/Index_Service_JSON2.asmx?wsdl

A simple test page is also available for use in a browser to see the methods that can be called in the Inventory Service:

http://stratus.cr.usgs.gov/index_service/Index_Service_JSON2.asmx

All methods in this interface accept a Callback function as a parameter.



4.2 return_Attribute_List

This method returns a list of ALL of the attributes that are available for querying per dataset. Note that each of these attributes is not guaranteed to be populated for every dataset, although

most are. For example, a “view-only” dataset will have a blank value for the PRODUCTKEY attribute which designates the USGS internal download code for that dataset. Please refer to the document “Inventory Web Service Attribute Descriptions” for a text description of the meaning of each attribute and possible values for each attribute.

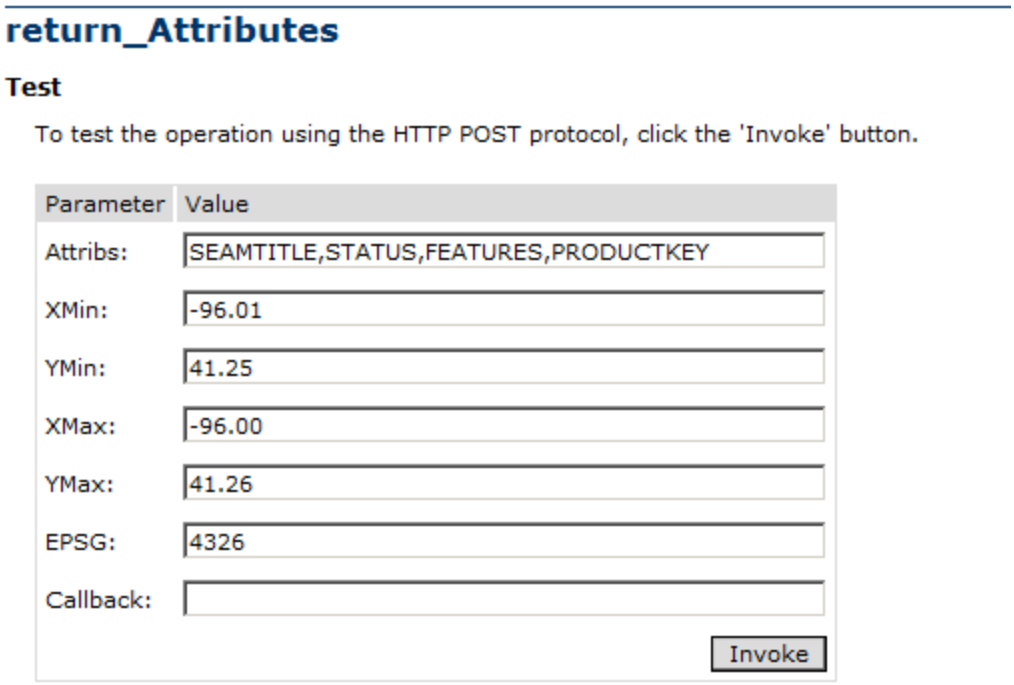

```
{
     "identifier":"ID",
     "label":"name",
     "items":[{"ID":0,"name":"AREA_NAME"},
              {"ID":1,"name":"RESOLUTION"},
              {"ID":2,"name":"UNITS"},
              {"ID":3,"name":"SQ_MI"},
              {"ID":4,"name":"SQ_KM"},
              {"ID":5,"name":"FEATURES"},
              {"ID":6,"name":"TYPE"},
              {"ID":7,"name":"STATE_NAME"},
              {"ID":8,"name":"NGTOC"},
              {"ID":9,"name":"STOR_LOC"},
              {"ID":10,"name":"STATE_ABR"},
              {"ID":11,"name":"PER_COV"},
              {"ID":12,"name":"QUAD_EQ"},
              {"ID":13,"name":"ACQ_YEAR"},
              {"ID":14,"name":"ACQ_MONTH"},
              {"ID":15,"name":"GB_RAW"},
              {"ID":16,"name":"GB_SDE"},
              {"ID":17,"name":"USE_RESTRC"},
              {"ID":18,"name":"PROJECTION"},
              {"ID":19,"name":"SOURCE"},
              {"ID":20,"name":"STATUS"},
              {"ID":21,"name":"WMS_SRVC"},
              {"ID":22,"name":"WMS_SRVR"},
              {"ID":23,"name":"WMS_URL"},
              {"ID":24,"name":"META_URL"},
              {"ID":25,"name":"U_SCALE"},
              {"ID":26,"name":"L_SCALE"},
              {"ID":27,"name":"FEMA_WT"},
              {"ID":28,"name":"SEAMTITLE"},
              {"ID":29,"name":"PRODUCTKEY"},
              {"ID":30,"name":"BBOX_WSEN"},
              {"ID":31,"name":"WMS_LYR"},
              {"ID":32,"name":"REMV_SDDS"},
              {"ID":33,"name":"AVAI_TDDS"},
              {"ID":34,"name":"AVAI_NGTOC"},
              {"ID":35,"name":"AVAI_SDDS"},
              {"ID":36,"name":"VHRO_HRO"},
              {"ID":37,"name":"UNIQUE_ID"},
              {"ID":38,"name":"LYR_URL"}
             ]
}
```

4.3 return_Attributes

This is the method that is used to return information for a specific geographic area for all available data themes. As its input it requires a comma separated list of desired attributes (obtained from **return_Attribute_List** method described above), a geographic area of interest, and a projection code. Currently, the only projection code that can be used is:

4326: Geographic WGS-84

Using the test page, here is an example for the Omaha, Nebraska area. Our query will look like this:



This query is asking for four attributes to be returned for each product that intersects the area of interest. When we invoke this method we see quite a bit of information returned – the four attributes we requested for each product from the USGS EROS Seamless and Tiled inventories that has been intersected.

A partial listing of the results is as follows- this section showing a dataset from the Orthoimagery theme:


```
{       "ID":2,
        "SEAMTITLE":"Apr 2010 0.15m Color Orthoimagery - Douglas County, NE",
        "STATUS":"Tiled",
        "FEATURES":"No_WMS",
        "PRODUCTKEY":"OJT"
}
```

Further down in the results is another product, this one from the Land Cover theme…


```
{       "ID":4,
        "SEAMTITLE":"National Land Cover Database 2001 - Land Cover",
        "STATUS":"Tiled",
        "FEATURES":"No_WMS",
        "PRODUCTKEY":"L1L"
}
```


And later we see a 'View-Only" dataset. Since this dataset is View-Only, there is no product key associated with this dataset.


```
{       "ID":1,
        "SEAMTITLE":"Viewable Combined High Resolution Orthoimagery",
        "STATUS":"Seamless_VO",
        "FEATURES":"View_Only",
        "PRODUCTKEY":" "
}
```


Therefore, this method can be used to retrieve whatever information you desire regarding datasets in your particular area or interest. This information can then be presented to the user in your particular application depending on your needs.

4.4 return_Attributes_Download_Only

This method will return all of the same results as the "return_Attributes" method described in Section 4.3 except for the View-Only datasets. Using this method will cut down on the number of results returned if you are only interested in obtaining information about datasets that can be downloaded.

4.5 return_Attributes_By_Theme

This method returns requested attributes by querying the datasets you include in a comma-delimited list of THEMES, or leave the ThemeList blank to return all.

4.6 return_Attributes_By_Theme_Download_Only

This method returns requested attributes by querying the datasets you include in a comma-delimited list of THEMES, or leave the ThemeList blank to return all. Only records for datasets that can be downloaded will be returned.

4.7 return_Attributes_EO

This method returns requested attributes by querying only those datasets in the Emergency Operations theme.

4.8 return_Attributes_EO_Download_Only

This method returns requested attributes by querying only those datasets in the Emergency Operations theme. Only records for datasets that can be downloaded will be returned.

4.9 return_Attributes_Elevation

This method returns requested attributes by querying only those datasets in the Elevation theme.

4.10 return_Attributes_Elevation_Download_Only

This method returns requested attributes by querying only those datasets in the Elevation theme. Only records for datasets that can be downloaded will be returned.

4.11 return_Attributes_LandCover

This method returns requested attributes by querying only those datasets in the Land Cover theme.

4.12 return_Attributes_LandCover_Download_Only

This method returns requested attributes by querying only those datasets in the Land Cover theme. Only records for datasets that can be downloaded will be returned.

4.13 return_Attributes_Ortho

This method returns requested attributes by querying only those datasets in the Orthoimagery theme.

4.14 return_Attributes_Ortho_Download_Only

This method returns requested attributes by querying only those datasets in the Orthoimagery theme. Only records for datasets that can be downloaded will be returned.

4.15 return_Download_Options

Downloadable datasets are available to the public by including some user-defined options when submitting a download request. Depending on whether you desire a Seamless or a Tiled dataset, current options may be 1) the output format, 2) the type of metadata included in the download bundle, and 3) the type of file compression for the download bundle. Use this method to find out which of these options are available for a specific product. This method takes a PRODUCTKEY as input and returns the valid output formats, compression formats and metadata formats for this product.

If we use the PRODUCTKEY of "N1F" as our input, we get back this response showing the available download options for a Tiled (TDDS) product:

```
{       "identifier":"ID",
        "label":"productid",
        "items":[       {"ID":0,
                         "compressionformat":"Z-ZIP","metadataformat":"A-ALL",
                         "outputformat":"05-GridFloat,01-ArcGRID,12-IMG",
                         "productid":"N1F",
                         "type":"TDDS"}
                ]
}
```


The “outputformat” tag tells us that this Tiled product is available in three formats: GridFloat, ArcGrid, and IMG.

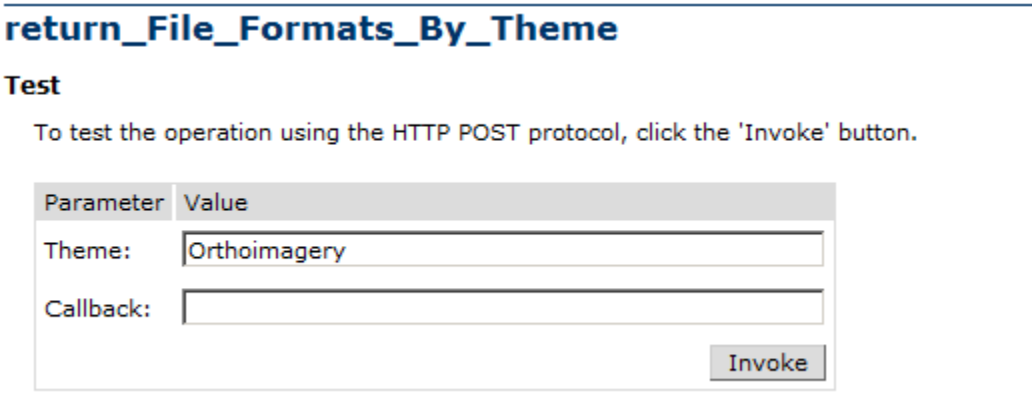
The “compressionformat” tag describes the possible bundling options – in this case, the bundle is available only as a zip file.

The “metadataformat” tag states that all possible formats of the metadata are included in the zip bundle.

Some of this information is required if you are going to request the data for downloading. When you request a Seamless product for download, you must also specify the desired output format, metadata format and bundling method. For Tiled products, you must only specify the productid and the desired output format.

4.16 return_File_Formats_By_Theme

This method can be used for obtaining a list of all possible output formats for layers in a data theme. Note that every dataset in this theme may not be available in all of the output formats listed in the response.




```
{       "identifier":"ID",
        "label":"formatname",
```

```
    "items":[       {"ID":0,"formatid":"02","formatname":"GeoTIFF"},
                    {"ID":1,"formatid":"12","formatname":"IMG"},
                    {"ID":2,"formatid":"13","formatname":"JPG"},
                    {"ID":3,"formatid":"14","formatname":"JPG2000"}
            ]
}
```


4.17 return_LYR_URL

This method can be used for obtaining a URL to the LYR (layer) file corresponding to the Service Name you input.

4.18 return_Meta_URLs

This method returns a list of URLs that can be used to obtain metadata URLs so that you can view the html metadata without downloading the data first.

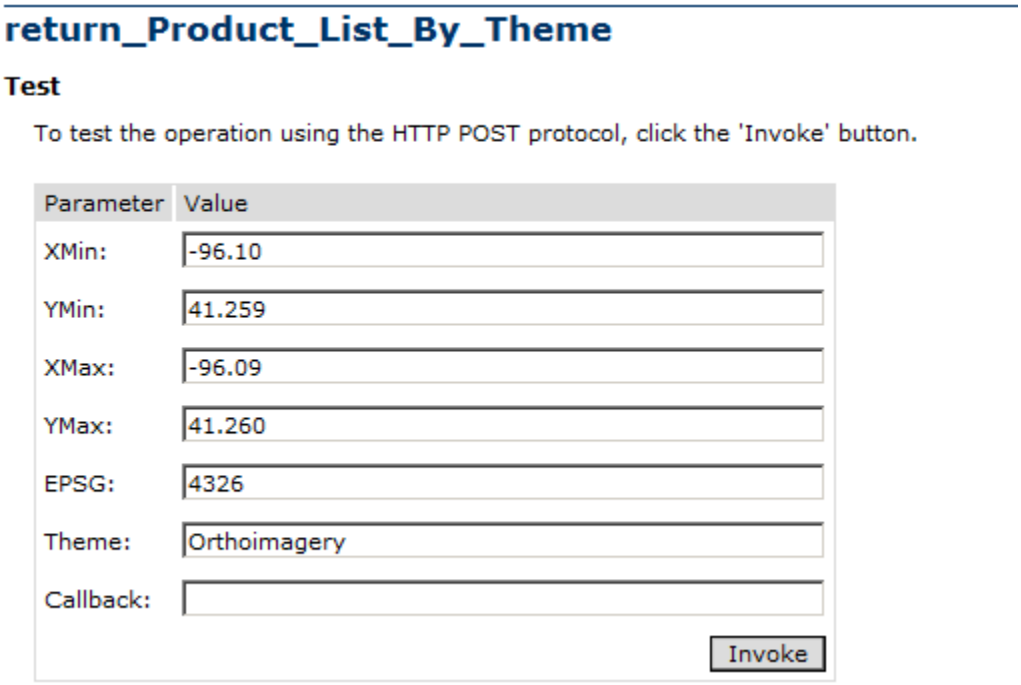
4.19 return_Product_Info

This method can be used for obtaining a few pre-defined attributes describing a particular dataset. For example, if we submit a productID of "P13" to obtain product information about NAIP data in UTM Zone 13, the data that was returned includes a metadata URL, and information that can be used to make a WMS image request.


```
{       "identifier":"ID",
        "label":"productname",
        "items":[       {"ID":0,
                         "acqmonth":"",
                         "acqyear":"",
                         "areaname":"",
                         "metadataurl":"http://extract.cr.usgs.gov/distmeta/servlet/gov.usgs.edc.
                                MetaBuilder?TYPE=HTML&DATASET=NAIP_Z13_G4",
                         "productid":"P13",
                         "productname":"NAIP (4 Band) UTM Zone 13N",
                         "projection":"",
                         "resolution":"",
                         "source":"",
                         "status":"",
                         "type":"SDDS",
                         "units":"",
                         "wmsdisplaymapservicelayer":"http://isse.cr.usgs.gov/ArcGIS/services/
                                Orthoimagery/USGS_EDC_Ortho_NAIP/MapServer/
                                WMSServer/?LAYERS=0",
                         "wmsoutlinemapservicelayer":"http://imsortho.cr.usgs.gov/servlet/
                         com.esri.esrimap.Esrimap/USGS_EDC_Ortho_NAIP_Footprints?
                         LAYERS=NAIP_UTM13_4BAND_FOOTPRINT"}
                ]
}
```

4.20 return_Product_List_By_Theme

This method can be used for obtaining a pre-defined list of attributes for all of the products of a particular theme that intersect with a particular geographic area.



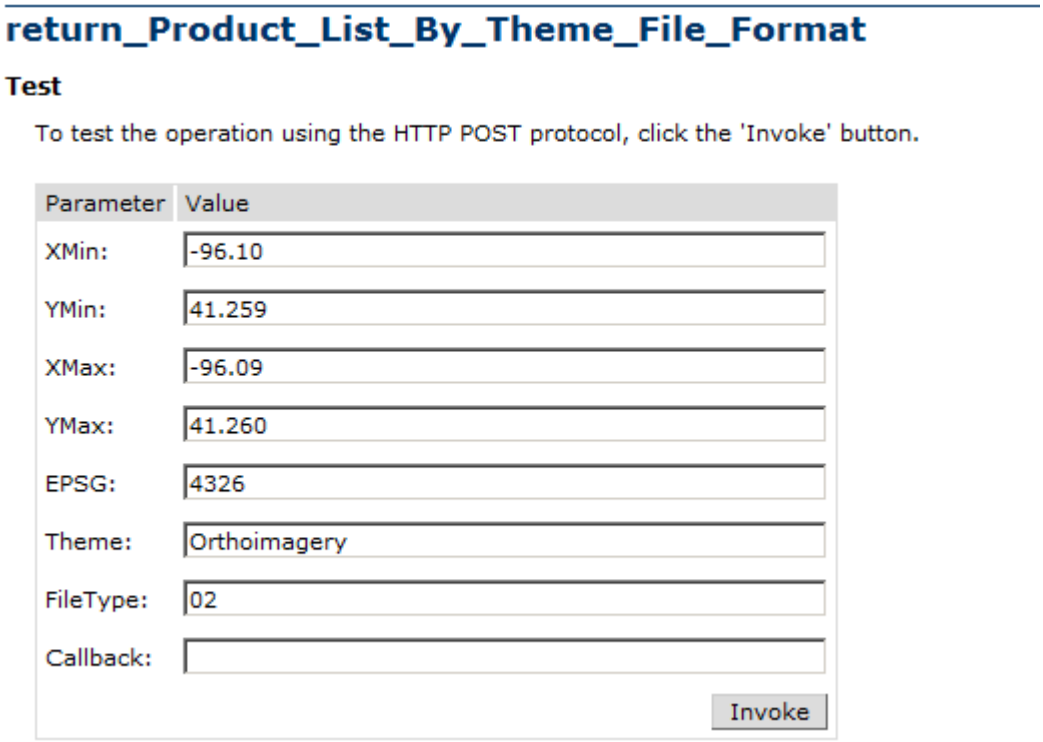
A partial listing of the response provides a product name, whether this is a Tiled (TDDS) or a Seamless (SDDS) dataset, metadata, and WMS information about each orthoimagery layer intersecting this area of interest.


```
{   "ID":1,
    "metadataurl":"http://extract.cr.usgs.gov/distmeta/servlet/gov.usgs.edc.MetaBuilder?
        TYPE=HTML&DATASET=NE_00001",
    "productid":"OFO",
    "productname":"Apr 2004 0.25m Color Orthoimagery - Omaha, NE",
    "type":"TDDS",
    "wmsdisplaymapservicelayer":"",
    "wmsoutlinemapservicelayer":"http://tddsinfo.cr.usgs.gov/ArcGIS/rest/services/?
        LAYERS=200404_Omaha_0x2500m_CL_OFO_TileIndex"
}
...
{   "ID":3,
    "metadataurl":"http://extract.cr.usgs.gov/distmeta/servlet/gov.usgs.edc.MetaBuilder?
        TYPE=HTML&DATASET=NE_00005",
    "productid":"OJT",
    "productname":"Apr 2010 0.15m Color Orthoimagery - Douglas County, NE",
    "type":"TDDS",
    "wmsdisplaymapservicelayer":"",
```

```
        "wmsoutlinemapservicelayer":"http://tddsinfo.cr.usgs.gov/ArcGIS/rest/services/
                201004_DouglasCounty_0x1500m_CL_OJT_Footprint?LAYERS=
                201004_DouglasCounty_0x1500m_CL_OJT_TileIndex"
}
...
{       "ID":4,
        "metadataurl":"http://extract.cr.usgs.gov/distmeta/servlet/gov.usgs.edc.MetaBuilder?
                TYPE=HTML&DATASET=NAIP_Z14_G4",
        "productid":"P14",
        "productname":"NAIP (4 Band) UTM Zone 14N",
        "type":"SDDS",
        "wmsdisplaymapservicelayer":"http://isse.cr.usgs.gov/ArcGIS/services/Orthoimagery/
                USGS_EDC_Ortho_NAIP/MapServer/WMSServer/?LAYERS=0",
        "wmsoutlinemapservicelayer":"http://imsortho.cr.usgs.gov/servlet/com.esri.esrimap.
                Esrimap/USGS_EDC_Ortho_NAIP_Footprints?LAYERS=
                NAIP_UTM14_4BAND_FOOTPRINT"
}
```


4.21 return_Product_List_By_Theme_File_Format

Using the same input as shown in Section 4.14, but this time also restricting the output by a selected output file format, we return only a subset (only those datasets with a possible output format of 14 (JPG2000).



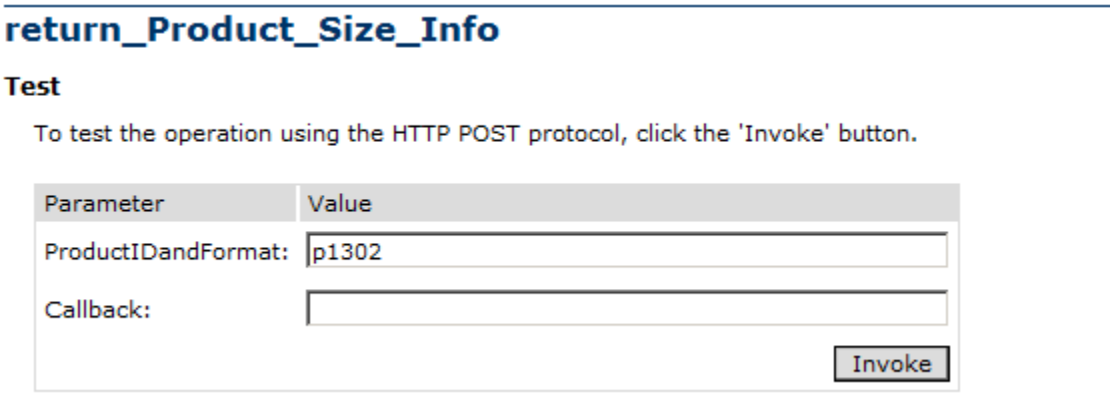
As of March 2013, there are only two orthoimagery datasets available in JPG2000 format in this area of interest.


```
{
        "productid":"p14",
        "type":"SDDS",
        "productname":"NAIP (4 Band) UTM Zone 14N",
        "metadataurl":"http://extract.cr.usgs.gov/distmeta/servlet/
        gov.usgs.edc.MetaBuilder?TYPE=HTML&DATASET=NAIP_Z14_G4",
        "wmsdisplaymapservicelayer":"http://isse.cr.usgs.gov/ArcGIS/services/
        Orthoimagery/USGS_EDC_Ortho_NAIP/MapServer/WMSServer/?LAYERS=0",
        "wmsoutlinemapservicelayer":"http://imsortho.cr.usgs.gov/servlet/
        com.es ri.esrimap.Esrimap/USGS_EDC_Ortho_NAIP_Footprints?
        LAYERS=NAIP_UTM14_4BAND_FOOTPRINT"
},
{
        "productid":"v8i",
        "type":"SDDS",
        "productname":"Mar 2007 Color Orthoimagery - Douglas County, NE",
        "metadataurl":"http://extract.cr.usgs.gov/distmeta/servlet/
        gov.usgs.edc.MetaBuilder?TYPE=HTML&DATASET=ST_126_001&",
        "wmsdisplaymapservicelayer":"http://imsortho.cr.usgs.gov/wmsconnector/
        com.esri.wms.Esrimap/USGS_EDC_Ortho_Nebraska?LAYERS=
        NE_DouglasCounty_0.5ft_Color_Mar_2007_01,NE_DouglasCounty_0.5ft_
        Color_Mar_2007_02",
        "wmsoutlinemapservicelayer":"http://imsortho.cr.usgs.gov/servlet/
        com.esri.esrimap.Esrimap/USGS_EDC_Ortho_Nebraska?LAYERS=
        NE_DouglasCounty_0.5ft_Color_Mar_2007_Footprint"
}
```

4.22 return_Product_Size_Info

Earlier versions of the Inventory Service did not have the capability to provide output format information about Tiled datasets. Therefore, this method provided valid information and xml tags appropriate for Seamless datasets only. Use the newer "return_Product_Size_Info2" method which will provide more correct xml tags for Tiled datasets.

Given a product key and desired output format, this method returns the estimated file size in MB per square degree for Seamless datasets. Using this value and your area of interest, you can then estimate the total size in MB of your requested area. Since the response xml tag is <mbsqdeg>, it is appropriate for Seamless datasets, but not Tiled datasets.




```
{       "identifier":"ID",
        "label":"productidformat",
        "items":        [   {"ID":0,
                             "mbsqdeg":"30000",
                             "productidformat":"p1302"
                            }
                        ]
}
```


4.23 return_Product_Size_Info2

This method provides size information for both Tiled and Seamless datasets. The xml response tags are different depending on whether the product is Tiled or Seamless. "P1302" is a designator for a Seamless dataset (P13) in GeoTiff format (02). Notice the <mbsqdeg> tag in the response:


```
{       "identifier":"ID",
        "label":"productidformat",
        "items":    [     {"ID":0,
                           "mbsqdeg":"30000",
                           "productidformat":"p1302"}
                       ]
}
```

Since Tiled datasets are pre-packaged and of a consistent geographic area per tile, this method provides a different tag for Tiled datasets. "OPX02" is a designator for a Tiled dataset (OPX) in GeoTiff format (02). Notice the <mbtile> tags in the response:

```
{       "identifier":"ID",
        "label":"productidformat",
        "items":  [   { "ID":0,
                        "mbtile":"75",
                        "productidformat":"OPX02"}
                ]
}
```

Therefore, you can use this method to provide approximate tile sizes or area of interest size estimates per available product/format combination.

4.24 return_Theme_List_By_ProductID

This method returns a list of those themes which contain the specific product.

4.25 return_Themes

Various datasets have been assigned to one or more data themes. Use this method to obtain the current list of themes and their corresponding theme IDs.

4.26 return_WMS_URLs

Use this method to obtain pre-made example URLs for WMS requests for a specific geographic area. Three data themes are currently queried – Elevation, Land Cover, and Orthoimagery. Note that the particular map service may not honor the requests with a valid image if the map service has pre-defined limits based on scale or other factors. These URLs serve only as examples that can be modified as needed. Datasets that reside on USGS EROS on-line systems will have valid WMS URLs. "Historical" datasets that have been demoted to near-line systems have been removed from the map services and therefore will no longer have WMS information contained in their records.

4.27 return_WMS_URLs_ORTHO

Use this method to obtain pre-made example URLs for WMS requests for a specific geographic area. Only Orthoimagery datasets are queried. Note that the particular map service may not honor the requests with a valid image if the map service has pre-defined limits based on scale or other factors. These URLs serve only as examples that can be modified as needed. Datasets that reside on USGS EROS on-line systems will have valid WMS URLs. "Historical" datasets that have been demoted to near-line systems have been removed from the map services and therefore will no longer have WMS information contained in their records.